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THE UNITED STATES OF AMERICA

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United States Patent and Trademark Office

December 08, 2003

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APPLICATION NUMBER: 60/416,255

FILING DATE: October 07, 2002

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**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

TO

**INVENTOR(S)**

| Given Name (first and middle (if any)) | Family Name or Surname | Residence<br>(City and either State or Foreign Country) |
|--|------------------------|---|
| Shaul                                  | SHAPIRO                | Tel Aviv, Israel  |

☐ Additional inventors are being named on the \_\_\_\_\_ separately numbered sheets attached hereto
**TITLE OF THE INVENTION (500 characters max)**

Manipulation of Text Objects within Electronic Graphic Documents

Direct all correspondence to:

**CORRESPONDENCE ADDRESS**

Customer Number

Type Customer Number here

Place Customer Number  
Bar Code Label here

OR

Firm or  
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**ENCLOSED APPLICATION PARTS (check all that apply)**

Specification Number of Pages

17



CD(s), Number



Drawing(s) Number of Sheets

5



Other (specify)



Application Data Sheet. See 37 CFR 1.76

**METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT**

Applicant claims small entity status. See 37 CFR 1.27.



A check or money order is enclosed to cover the filing fees



The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number:

501115



Payment by credit card. Form PTO-2038 is attached.

FILING FEE  
AMOUNT (\$)

\$80.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.



No.



Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE

Date 10/07/2002

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REGISTRATION NO.

30,564

(if appropriate)  
Docket Number:

1609

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**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

ישראל, רוברטס, זיסמן ושות'  
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100702

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J1129 U.S. PTO

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ITZHAK ZISMAN

Date: 7 October 2002

The Commissioner of Patents and Trademarks  
Box Patent Application  
Washington D.C. 20231

Dear Sir,

Enclosed herewith for filing is the following PROVISIONAL patent application:

Title of Application: MANIPULATION OF TEXT OBJECTS WITHIN ELECTRONIC  
GRAPHIC DOCUMENTS

Inventor(s): Shaul SHAPIRO

Specification: 17 pages (including page(s) of claims)

Drawings: 5 pages

Docket No.: 1609

TOTAL FILING FEE:

☒ Charge Deposit Account 50-1115 (Shiboleth, Yisraeli, Roberts, Zisman & Co.)  
in the amount of \$80.00 (Basic Filing Fee)

☒ Small Entity Declaration (by attorney: Attorney hereby verifies applicant qualifies  
for small entity status)

Also enclosed herewith for filing are:

☒ Provisional Patent Application Cover Sheet (PTO/SB/16)

☒ Fee Transmittal (PTO/SB/17)

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Respectfully submitted,

Edward Langer  
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J1129 U.S. PTO  
60/416255  
10/07/02

PTO/BB/17 (10-01)  
 Approved for use through 10/31/2002, OMB 0851-0032  
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# FEE TRANSMITTAL for FY 2002

Patent fees are subject to annual revision.

TOTAL AMOUNT OF PAYMENT (\$) 80.00

## Complete if Known

Application Number  
 Filing Date  
 First Named Inventor Shaul Shalitz  
 Examiner Name  
 Group Art Unit  
 Attorney Docket No. 1609

## METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:
- Deposit Account Number 50-1115
- Deposit Account Name Shalitz, Yisrael, Roberts, Zisman & Co.
- ☒ Charge Any Additional Fee Required Under 37 CFR 1.18 and 1.17
- ☒ Applicant claims small entity status. See 37 CFR 1.27
2. ☐ Payment Enclosed:
- ☐ Check ☐ Credit card ☐ Money Order ☐ Other

## FEE CALCULATION

### 1. BASIC FILING FEE

| Large Entity Fee Code (\$) | Small Entity Fee Code (\$) | Fee Description        | Fee Paid |
|----------------------------|----------------------------|------------------------|----------|
| 101 740                    | 201 370                    | Utility filing fee     |          |
| 106 830                    | 206 165                    | Design filing fee      |          |
| 107 510                    | 207 255                    | Plant filing fee       |          |
| 108 740                    | 208 370                    | Reissue filing fee     |          |
| 114 160                    | 214 80                     | Provisional filing fee | 80.00    |

SUBTOTAL (1) (\$) 80.00

### 2. EXTRA CLAIM FEES

| Total Claims              | Extra Claims | Fee from below | Fee Paid |
|---------------------------|--------------|----------------|----------|
| Independent Claims        | -20** =      | X              |          |
| Multiple Dependent Claims | -3** =       | X              |          |

| Large Entity Fee Code (\$) | Small Entity Fee Code (\$) | Fee Description  |
|----------------------------|----------------------------|--|
| 103 18                     | 203 8                      | Claims in excess of 20                                     |
| 102 84                     | 202 42                     | Independent claims in excess of 3                          |
| 104 280                    | 204 140                    | Multiple dependent claim, if not paid                      |
| 109 84                     | 209 42                     | ** Reissue independent claims over original patent         |
| 110 18                     | 210 8                      | ** Reissue claims in excess of 20 and over original patent |

SUBTOTAL (2) (\$)

\*\*or number previously paid, if greater; For Reissues, see above

## FEE CALCULATION (continued)

### 3. ADDITIONAL FEES

| Large Entity Fee Code (\$) | Small Entity Fee Code (\$) | Fee Description   | Fee Paid |
|----------------------------|----------------------------|---|----------|
| 105 180                    | 205 65                     | Surcharge - late filing fee or oath                                       |          |
| 127 60                     | 227 25                     | Surcharge - late provisional filing fee or cover sheet                    |          |
| 139 180                    | 189 130                    | Non-English specification   |          |
| 147 2,620                  | 147 2,620                  | For filing a request for ex parte reexamination                           |          |
| 112 920*                   | 112 920*                   | Requesting publication of SIR prior to Examiner action                    |          |
| 113 1,840*                 | 113 1,840*                 | Requesting publication of SIR after Examiner action                       |          |
| 115 110                    | 215 55                     | Extension for reply within first month                                    |          |
| 116 400                    | 216 200                    | Extension for reply within second month                                   |          |
| 117 920                    | 217 460                    | Extension for reply within third month                                    |          |
| 118 1,440                  | 218 720                    | Extension for reply within fourth month                                   |          |
| 128 1,360                  | 228 680                    | Extension for reply within fifth month                                    |          |
| 119 320                    | 219 160                    | Notice of Appeal  |          |
| 120 320                    | 220 160                    | Filing a brief in support of an appeal                                    |          |
| 121 280                    | 221 140                    | Request for oral hearing  |          |
| 138 1,510                  | 138 1,510                  | Petition to institute a public use proceeding                             |          |
| 140 110                    | 240 55                     | Petition to revive - unavailable  |          |
| 141 1,280                  | 241 640                    | Petition to revive - unintentional  |          |
| 142 1,280                  | 242 640                    | Utility issue fee (or reissue)  |          |
| 143 480                    | 243 240                    | Design issue fee  |          |
| 144 620                    | 244 310                    | Plant issue fee   |          |
| 122 130                    | 122 130                    | Petitions to the Commissioner   |          |
| 123 50                     | 123 50                     | Processing fee under 37 CFR 1.17(q)                                       |          |
| 126 180                    | 126 180                    | Submission of Information Disclosure Stmt                                 |          |
| 581 40                     | 581 40                     | Recording each patent assignment per property (lines number & properties) |          |
| 145 740                    | 245 370                    | Filing a submission after final rejection (37 CFR § 1.128(a))             |          |
| 149 740                    | 249 370                    | For each additional invention to be examined (37 CFR § 1.119(b))          |          |
| 179 740                    | 279 370                    | Request for Continued Examination (RCE)                                   |          |
| 189 900                    | 189 900                    | Request for expedited examination of a design application                 |          |

Other fee (specify)

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$)

## SUBMITTED BY

Name (Print/Type) Edward Langer

Signature 

Registration No. 30,584

(Attorney/Agent)

## Complete if Applicable

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Date 10/07/2002

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Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

## A U.S Provisional Patent Application

### Title:

**Manipulation of text objects within electronic graphic documents**

### Inventor:

Shaul Shapiro, 2 Eldad Hadani st., Tel Aviv 69864, ISRAEL

### Field of the Invention:

This invention is related to a document processing method and corresponding system, and especially to the method and system used to *automatically* manipulate the text objects contained within existing electronic graphic documents.

### Background of the Invention:

*A Glossary of Graphic Arts professional expressions is provided in Appendix B.*

Modern electronic document processing for publishing, either for print or digital display, frequently requires design and production of visually rich content.

There are many software packages available for professional creation, layout and editing of drawings, illustrations and images, together with text. Henceforth such hybrid documents will be generally referred to as *Artwork*.

A distinction may be drawn between *Artwork* creating programs and word-processing, spreadsheet, database and other, typically office oriented applications, which may also have some limited *Artwork* creation functionalities, but are primarily designed for different uses.

A condensed list of popular *Artwork* creating software programs, which are sometimes referred to as Graphic, Illustration, CAD and DTP applications, will be presented later in this document in Appendix A.

An *Artwork* creating software program will be referred to as *Artwork program*.

Typically an *Artwork* may contain text in short descriptive phrases, such as titles, slogans, labels, annotations, headers, captions, inscriptions, etc., henceforth to be referred to as *Text Objects*. Some *Artwork programs*, namely Illustration (Draw) programs, are especially designed to create complex graphics that may also contain numerous short text labels, such as maps.

The disclosed invention is concerned with text handling capabilities (or limitations thereof), of currently available *Artwork* creating software. A brief description of the common text handling capabilities of these programs is hereby presented.

All prior-art *Artwork programs* offer tools for entering, importing and editing of text, typically allowing manipulation of text formatting. These *Artwork programs* provide tools to manipulate various features pertaining to Character Attributes such as typeface, font size, weight, alignment, etc., Paragraph Attributes such as, width, height, justification, line spacing, etc., and Graphic Attributes such as position, distribution, direction and relations to other objects. These features may be accessed and precisely manipulated.

Illustration programs further provide tools for applying special effects to text, such as attaching text to path, wrap text around graphics, scale, mirror, reflect, add outline, inline, zoom and highlighting effects. Henceforth the combined text formatting and transformation features will be referred to as *text object attributes*.

Modern structured documents may be produced, using *layer* and *style* metaphors, allowing names to be applied to *layers* and to sets of appearance attributes called *styles*.

*Artwork programs* are typically operated by skilled professionals such as graphic designers, draftsmen, cartographers and DTP computer operators, trained in using these sophisticated software tools. Henceforth the typical operator of an *Artwork* program will be referred to as *Designer*.

An *Artwork* can be a pre-press job, such as a road map, a packaging design, a drawing of a machine part, an advertisement or illustration, to be subsequently printed as a map, on a poster, in a magazine or newspaper, etc., or it can become a web page or part of a multi-media presentation.

A pre-press example of a typical geographic map for a school atlas will be provided here and utilized throughout this presentation.

The preparation of a single page of *Artwork* involves several stages and requires many steps and operations.

The *Designer's* job typically originates from other professionals, such as teachers, engineers, scientists, art directors, editors and other professionals from vastly diverse fields. We shall use the general term *Originator* henceforth in this document. An *originator* would typically specify the required *artwork* and provide the information needed by the *designer* to perform the production of the *artwork*.

In a typical pre-press workflow several stages of planning, design, editing, revising, and correcting are required. A *designer*, working with an *Artwork program*, is required to provide intermediate proofs both for review and comment by the *originator*, proof readers or experts in the relevant content.

Examining a typical workflow nowadays will likely reveal that, due to differences in computer programs and computer platforms, the designer's output (*Artwork*) is seldom sent out as a "working file" (native *Artwork program* file format), but is printed out as a "hard copy" or delivered as digital files, typically Adobe Acrobat (PDF) files which are universally viewable, notatable and printable.

Since the *originator*, *designer*, editor, proof reader etc., seldom work together at the same physical place, printed proofs and/or PDF files need to be distributed or passed along from one professional to the next, and their various recommendations need to be indicated and sent back to the *designer*. Typically, required modifications to the *Artwork* have to be manually performed by the *designer*, within the specific *Artwork* program.

The typical production process, involving several steps, operations and interactions between several professionals, for a typical job such as a map for a school atlas, as an example for a single page of *artwork*, may take several days or weeks until approved and considered final.

#### ***When translation of Artwork is required:***

Once completed, it may be desired to translate the textual content of the *Artwork* into other languages. The new desired language will be referred to henceforth as the *target language*. The text in the source *Artwork*, in the original language, will be henceforth referred to as the *source language*.

A copy of the *Artwork*, in the *source language*, in the form of printed "hard copy" and/or PDF file will typically be sent out for the preparation of the required translations to the *target language*. To this end, the text elements in the *Artwork* must be located, marked for translation and preferably, extracted to a text file.

Typically an *Artwork program* provides an option to "export" a file with the text strings only (.txt), or with some limited formatting (.rtf) file. No information concerning layers or styles, nor attributes such as Graphic, Effect and Transformation Attributes are typically included in such files.

A text file is the most common file format allowing translators to work on their preferred computer platform, in their own programs, typically word processing applications, to provide

their translations. Within the word-processing program, translations are typed or imported ("copy and paste" operation) next to or following to the original text elements. Translators may make use of "Translation Memory" programs that offer tools for recycling of existing translations.

Typically a translator may not be skilled in the use of *Artwork programs*, so the *target language* translations are provided to the *designer* in the translators' word-processing program file format, as an RTF file, as a plain text file or as "hard copy" printout. For ease of use the *source language text* together with the *target language*, may be provided in a tabular format.

The *designer* has to "open" the relevant *source Artwork* file in its originating *Artwork program*, and replace each text element with its corresponding *target language* translation. At present, the *designer* has to do this manually. Each text element must be identified, located, selected, and the *target language* text needs to be retyped or "pasted" by a "copy and paste" operation, to replace each desired text element.

To provide the *target language* text elements for the "copy and paste" operation, the translator's file must be opened, each *target language* text element identified, located, selected and "copied" manually into the computer's memory "clipboard". A typical "find and replace" operation may also be employed, involving substantially the same operations, gaining efficiency mainly when an *Artwork* is heavily cluttered with *text objects*.

For the translation of a typical *Artwork*, such as a road map, this same procedure may need to be repeated numerous times.

Working with several languages may require loading additional operating system support for the relevant language. Typing a translation in another language, especially for other scripts such as Cyrillic, Hebrew or Arabic, will usually involve loading the appropriate keyboard layout file (in MS Windows - through the Control Panel, International) and may also require replacing the actual hardware keyboard attached to the computer, as this keyboard usually corresponds to the primary language of the user.

*Target language* text may also require change of fonts, appropriate fonts may need to be selected, obtained and installed on the *designer's* computer.

Additional operations may also be required from the *Designer* such as specifying, creating and naming new styles and layers. Text in one language is rarely similar to the same text in another language as to the number of characters or words.

*Designer* intervention may further be required in order to manipulate *target language* text alignment, placement and attributes, such as character size and weight, kerning, etc.

A *designer* may not be proficient in the *target language*. Thus, incorrect replacements and spelling mistakes ("typos") are likely to happen and careful proofreading is required.

When corrections are indicated, the *designer* needs to re-open the relevant *Artwork*, each faulty text has to be identified, and manually replaced or corrected.

For translation of *Artwork* into foreign scripts, a *designer* with the specific language skills may need to be enlisted, or the *Artwork* file may need to be passed on to another *designer*, possibly in another country.

#### ***When adding a translation onto Artwork is required:***

It is sometimes required to add a *text object* onto an existing *artwork*, in a location relative to an existing *text object*. Such additions may be required when an additional *text object*, in another language, such as a translation, transliteration or alternative name, needs to be inserted to appear next to a *source text object*. Typically the added text may be required in a different font, possibly with different attributes such as size or color.

In such a case, when the *source text object* is not erased or replaced, the *Designer* needs to identify and locate manually, both the relevant *source* and *target text objects* and manually

place, align and apply the relevant attributes, for each additional text object. Precise positioning and alignment of the additional text object, in an exact relative position to an existing text object is typically required.

***Related Prior Art:***

Various software programs may offer extraction of text from existing text document files such as word processing, etc., for purposes such as construction of terminology lists, indexing, aligning for translation, etc. Other programs typically parse existing software resource files extracting text for translation of the user interface and messages needed for construction of localized or multi-lingual computer software and operating systems. Particularly important for this discussion are Translation Memory (TM) or Machine assisted Human Translation (MAHT) and Terminology Management Tools. These software tools allow the translator to improve his productivity and consistency by re-using terms and sentences they have translated in the past.

The following US Patents may be regarded as prior art: 6,345,244, 5,678,039, 5,678,039, 5,497,319, 5,850,561, 5,551,055.

The popular Adobe Acrobat™ Portable Document Format (.pdf) may be defined as an *Artwork* file. Several commercial software programs, such as JADE by BCL Technologies, are offering extraction of text from within Acrobat files, with some of it's formatting. These programs allow only "one way" extraction, typically for further manipulation in other programs.

A more flexible, automatic method for replacing text objects is offered by Adobe Systems Inc.®. This method, named "Data-Driven Graphics" may be performed from within Adobe Illustrator™ *Artwork program*. This method involves manually placing variables to be embedded (bound) to objects. The textual content may be accessed and manipulated automatically through the identification of these embedded variables. Access to previously embedded code is also offered by Adobe Systems® in their Graphics Server functionalities.

**Limitations of Prior Art Methods:**

The automatic methods offered by Adobe Systems® are incapable of processing the vast numbers of existing *Artwork* digital files. These methods involve manual insertion of variables, so any desired manipulation to the text objects requires extensive manual handling of each text object. No automatic method is offered for extraction of *text objects*. No external interface for manipulating properties is offered.

All other (none Adobe) prior-art methods may now be further criticized.

The typical text handling capabilities provided by the prior-art is limited to basic formatting properties only, such as typeface, size, weight, justification, tabs, etc.

For clarity, a fundamental distinction should be drawn between simple text, which may carry some limited formatting properties, and *Text Object Attributes* having a wide set of properties pertaining to the appearance of the text object (as described at the beginning of this document).

Prior-art may provide a method to externally edit content but fail to provide for precise transformations, manipulations and modifications to position and appearance attributes. Prior-art makes no reference to *text objects*, in the sense used within graphic, *Artwork* producing applications, where a text is also regarded as a *graphic object*.



Prior-art makes no reference to the layers structure, an extremely important feature of *Artwork* programs.

Access to *Text Object Attributes* is offered only within *Artwork program*s, programs typically having strong reliance on the Postscript PDL (Page Description Language) and its underlying Vector (Object Oriented) structure.

*Artwork* programs fundamental design is based upon a basically static, fixed location to each and every text object, with precise reference to "points" on a page. In contrast, the position of texts in text editors and word-processing programs is *relative* to the text preceding it on the page, and may be modified by changes in previous pages. Text editors and word-processing programs are generally concerned with multi-page documents and the flow of "running" text. If a portion of text is removed, the following portion of the document will typically "re-flow". When a change to the page size or the margins is performed, it will typically influence the formatting and all text may re-flow, forcing movements to all text and other elements.

#### ***Summary of the Background:***

A fundamental limitation of the above-described processes is that they totally separate between the *Originator* and the project's *Artwork*.

Another limitation of the above-described process is that the designer, operating his *Artwork program*, must accomplish all manipulations to the text objects contained in an *Artwork manually*.

When external database interactivity is desired for *text object* replacement, each and every text object must be manually provided with special information or code, from within the *Artwork program*.

The above described processes are costly because they laborious, tedious, time consuming and prone to error.

There is no currently available method and system to accomplish the above in an automatic, cost efficient manner.

#### **Description of the Invention:**

Two preferred embodiments of the invention are hereby disclosed, each employing different means for achieving the same end.

##### **First embodiment:**

In the first embodiment, the extraction of *text objects* is performed from within the *Artwork Program*, at *run-time*, through the use of specifically developed plug-in software.

A schematic flow chart of this embodiment is provided, marked as Fig.1. The plug-in software module, labeled "Extractor", is marked as task # 2 in Fig.1.

The "Extractor" 2 extends the capabilities of the *Artwork Program* original functionalities, offering several options for automatic extraction of the desired text objects, together with all pertaining information, into a suitably pre-constructed database.

The "Extractor" 2 scans the *Source Artwork* 1 and extracts each *text object* with its corresponding *text object attributes*, together with other desired information and populates a database table, marked as task # 3 in Fig.1. (This done with tools known in the art).

This table marked *Source Project Database* #3 is pre-constructed in such a way, that each *Source Artwork Text object* is defined as a record (row), and stored with any desired information related to it, such as its layer name, *text object attributes*, style, position, alignment, orientation, location, color, etc., each arranged in their respective database fields (columns). Exact location coordinates defining bounding box of the text object, its shape, angle, orientation, direction any other desirable information may be included.

A sample (partial "screen grab") of such database 3 is provided and marked as Fig. 2.

The "Extractor" 2 further analyzes the records and automatically assigns an alphanumeric Style Name to each record in the database 3.

Objects that share a predefined set of attributes, such as the same typeface, font size, weight etc., are assigned similar Style Names.

Another table is automatically created, listing all the different newly created Style Names together with their defining attributes. The Styles Table is attached to the database table #3.

A sample of a Styles Table is shown in Fig. 3.

The "Extractor" 2 further assigns a unique ID number to each record in the Table 3.

These database tables 3 will henceforth be referred to as the *Source Project Database 3*.

A *Multi-lingual Master Database*, marked as # 6, is also provided for storage, management and control of the acquired data from many related *Project Databases*. This Master Database may be automatically expanded with translations and relevant other related data accumulated from previous related projects and evolves with each use.

*The Master Database may be a Relational Database. It may be provided with tools to connect to other, external or remote databases, dictionaries and glossaries, to search and obtain required data.*

A specially prepared software program marked #5 is provided to perform the task of "looking up" and retrieving candidate translations for each *source text object*. Software program #5, also referred to as *DB Interface "A" 5*, is designed to scan the *Multi-lingual Master Database 6*, in search for previously stored translations in the required *target language*. If previous translations are found, they are retrieved and placed in a "Candidate translations" field in the *Source Project Database 3*. If previous translations are not found, the corresponding field is left blank.

The augmented database file is marked as task # 7. This database will be referred to as the *Intermediate DB 7*.

Additional manual translations may also be required.

Typically, modifications would be required to the target (new translation) text attributes, graphic attributes, alignment, position, etc.

Fields in the Styles Tables such as "New Font name" and "New Font Size" should be provided with the required information.

The New TextStyle field, (that was automatically created by the "Extractor" 2), has been assigned a numbered code. This code represents the set of new text attributes that will be applied to the *Target text object*, when it will be integrated back into the *Artwork*. These fields should be provided with the required information.

The required manual operations are performed with another software module, marked as task # 9, henceforth to be referred to as *DB Interface "B" 9*. Verification of the candidate translations retrieved previously from the *Master database 6*, is performed at this stage. With tools, known in the art provided, conversions may be performed into desired tabular, textual (with formatting such as tab delimiters or otherwise), word processing, database or spreadsheet format.

Conversions of character sets for different language and localization issues may be addressed and the desired data conversion performed, such as conversions to 16-bit UNICODE character set.

The *DB Interface "B" 9* also performs conversions into any desired format that may be needed to provide the data in a format suitable for the Originator, translator, editor or any other professional who may need to review the data and provide additional input. Since the data is in a textual, tabular, database format, it may easily be organized, segmented, and partitioned and presented in any desired format such as popular spreadsheet Microsoft Excel,

or as tabulated text in an MS Word file, or plain tabulated text, with or without identifying codes, tags, etc.

In the preferred embodiment, an Excel table is provided to the *Originator* or translator, who inserts his translations into the relevant empty cells in the fields provided in the table of Fig. 2.

The quality and accuracy of the translation process is enhanced by the fact that *Original Layer Names* are provided for each text object in the table of Fig. 2, so that the meaning or general classification of the term becomes readily apparent. This provides for an efficient, fast, less error prone process.

For example, if the name Sardinia (note table in Fig. 2) is not familiar to the translator, it is an invaluable "hint" to be able to ascertain that it is indeed, an Island, as indicated in the "Original layer" field of the table.

The Excel file, universally popular as it is, may be passed on to any other professional for inspection, verification or addition. The Excel file may be delivered with "embedded" functions, which may be evoked by "control buttons". After selection of a single record (row) and activation of an embedded function, that single record is displayed by itself, with all its data, in a customized, window interface, to allow easier access to any desired attribute and data and more direct manipulation of the relevant values. The *Originator* may decide to attach an additional *text object*, to appear in juxtaposition to an existing one. An instruction to ADD will be marked in a relevant field. The original *text object* will remain in the *Target Artwork*, instead of being replaced. Exact location of the added *text object* would be specified, relevant to the position of the existing *text object*, in specific values of distance and the required alignment, would be indicated in relevant fields.

The *Originator* may decide to delete a specific *text object*, by marking it as "non printing" in the relevant field. The *Originator* may modify and override any default attribute or style he may desire.

In the preferred embodiment, font size for the capital city "Rome" may be enlarged, or the alignment of a *text object* may be modified, such as "Centered" instead of "Left" aligned. The *Originator* may decide to add new *text objects* and specify their attributes. These new, added objects would appear on the *Target Artwork*, outside of the boundaries of the original artwork. The *designer*, within his *Artwork* program would provide exact positioning of each new text in an interactive mode, at a later stage. This step is marked as task #10 in Fig. 1. Typically, this step may need to be repeated after proofing and editing and the *Originator* may readily perform editing steps and refinements several times, without the manual work previously required by the *Designer* for every minor modification.

The *Originator* may further indicate, in a field provided in Fig. 2, that any new *target text object* be assigned to a new layer, leaving all original *source text objects* intact in their original layers. New layers are automatically created and named with the original layer's name with a predetermined prefix, such as NEW. New layers are automatically marked as "Visible layers", while the "old" layers are marked as "Invisible" layers.

Thus, new *target text objects* may be created within the original *Artwork* in separate layers, providing the *designer*, at a later stage, an option to "turn ON" or "turn OFF" the visibility and printability of selected layers for visual interactive inspection and modification.

Once a finished Excel file is returned to the DB Interface "B" 9, the final *Target Project Database*, marked as task #11 on Fig. 1, is automatically produced. A sample of such database is provided and marked as Fig. 4. This *Target Project Database 11* is holding all data, translations, modifications and instructions pertaining to each *text object* in the relevant project.

Another plug-in software labeled "Integrator", marked as task #12 is provided.

The original *Artwork* is "opened" and displayed on screen within its originating *Artwork program*.

The "Integrator 12" is activated within the *Artwork program*, provided with the path to the specific Target Project Database 11 file and onto the required target language field, and instructed to execute "Integration".

New *Target Text Objects* are automatically created and placed in the original *Artwork*, within the existing layers, replacing the their respective *Source Text Objects*, or added in juxtaposition. Alternatively, if so indicated by the *Originator* in the appropriate field in the table of Fig. 2, The new *Target Text Objects* may be created and placed in the original *Artwork*, within the new layers, without replacing the respective *Source Text Objects*. All the indicated language, and the appropriate attributes are applied, as indicated in the Target project database 11.

The target, translated *Artwork* is produced within the native *Artwork program*; this file should be saved under a new, suitable name. This step is the final step in the process described in Fig. 1 and is marked as task #13.

A printout "hard copy" and a PDF file are typically produced for further proofing and approval.

For demonstration of a "best mode" of the invention, a small section from a World Map, showing a simplified map of Italy, is presented in Fig. 5. Any popular graphic "draw" *Artwork program* may produce such a map. On this sample map, a few Text objects were placed. Fig. 5 shows the "Extraction 2" process of the *text objects* from the sample map into the Source Project Database 3 in a graphic manner.

Fig. 6 shows the "Integration" 12 step of the *translated text objects* from the Target Project Database 11 in the same graphic manner.

#### Second Embodiment:

In the second embodiment, the Extraction 2 is performed on a "closed" file, in the native program's file format. (Unlike "open" file, within the *Artwork program*, in the first embodiment described above).

This embodiment does not need the originating *Artwork program* to perform substantially the same functions as the first embodiment.

The disclosed embodiment may be implemented using the Adobe Illustrator file format, thus providing for its usability for many different *Artwork file formats*, by pre-conversion into "ai" (Adobe Illustrator) format and post-conversion into any other desirable *Artwork Format*. The Adobe Illustrator ("ai") file format is very popular and supported by many *Artwork programs* for data exchange.

In this embodiment tasks #4 up to #11 are practically the same as described for the first embodiment, and may be using the same software tools.

#### Summary of the invention:

- \* This invention provides a seamless two-way link between the *Originator* and the textual content of his "brainchild" *Artwork*.
- \* This invention extends this two-way link to the visual properties of the textual content, providing for the first time, external access and control of the visual appearance of the relevant *Text objects*.
- \* Additionally, externalizing the textual content and attributes into a structured data format, facilitates a datacentric approach and implementation of database techniques for building indexes, etc.
- \* Furthermore, the database approach to the textual content provides more direct editorial control over the content and visual appearance of the *Artwork*.

\* The external DB approach further provides efficient means for embedding and attaching extra information in a "hidden" form for purposes such as hyperlinks or links within the *Artwork Text Object* back to the relevant record in the *Target Project Database*.

\* The external DB approach also provides efficient means for embedding and attaching extra information in a "hidden" form for purposes such as attaching codes that may be later accessed by other programs, thus acting as a "front end" for other methods and systems, such as Adobe® Graphics Server.

#### **Advantages of the Invention:**

This invention enables fast, reliable, economic production of *Artwork* translated into other languages, while retaining the overall appearance of the source *Artwork*.

Additional benefits include: fast, reliable, economic production of indexes of the textual content of *Artworks*, which may be a major advantage in the production of large, text rich jobs such as atlases, for listing place names and their location on particular maps.

Further benefits include fast, reliable, economic abilities to embed additional information.

## Appendix A

A concise list of (prior-art) Artwork producing programs:

### Graphic Draw (Illustration, Vector) programs:

Illustrator™ from Adobe Systems Inc.®, USA.

Freehand™ from Macromedia Inc.®, USA.

Corel Draw™ from Corel Corporation®, Canada.

### Page layout programs:

Quark Express™, from Quark Inc. ®, USA.

Pagemaker™ from Adobe Systems Inc. ®, USA.

InDesign™ from Adobe Systems Inc. ®, USA.

These are popular desktop programs, typically used for design, layout, editing and manipulating of multi-page documents involving larger amounts of text together with and around graphics, drawings, illustrations and images.

### Image editing (paint) programs:

Photoshop™ from Adobe Systems Inc. ®.

PhotoPaint™ from Corel Corporation®, Canada.

These are typically used for creation, editing and manipulating of photographic (Bitmap) images, and also have some text handling capabilities.

All three above mentioned program families are commonly referred to as DTP (Desk Top Publishing) applications.

Computer Aided Design (CAD) programs such as AutoCad from Autodesk Inc. are typically used for design, production and editing of technical and engineering drawings.

## Appendix B

### Glossary:

#### Compiled from:

The Encyclopedia of Graphics File Formats © 1996, 1994 O'Reilly & Associates, Inc.  
The Designers Lexicon © 2000 By Ivy Press Limited and Alastair Campbell

#### Adobe Acrobat

A proprietary "portable document format" (PDF) file, which has fonts and pictures embedded in the document, enabling it to be viewed and printed on different computer systems.

#### Alphanumeric set

The complete set of alphabet characters, numbers, punctuation, and associated symbols and accents of a font.

#### Application/application program

A software program written to enable the user to create and modify documents for specific purpose, thus distinguishing it from operating system software and utilities (software that improves the functioning of your computer rather than enabling you to create anything). Typical application groups include those for page lay-out, graphics, word processing, and spreadsheets.

#### ASCII

Acronym for the American Standard Code. ASCII is the cross-platform, computer industry-standard, text-only file format.

#### Attribute (2)

the specification applied to a character, box, or other item. Character attributes include font, size, style, color, shade, scaling, kerning, etc.

#### Batch mode/processing

The processing of data in automated batches, as distinct from data that is processed as it is input (interactive mode, or "real-time"). For example, a spellchecker runs in batch mode when applied to a block of text, but not when applied to an individual word.

#### Bezier curve

In drawing applications, a curved line between two "control" points. Each point is a tiny database, or vector, which stores information about the line, such as its thickness, color, length, and direction. Complex shapes can be applied to the curve by manipulating "handles", which are dragged out from the control points.

#### Binary

An arithmetical system that uses 2 as its base, meaning that it can only be represented by two possible values—a 1 or a 0, on or off, something or nothing, negative or positive, small or large, etc.

**bitmap**

A set of numerical values specifying the colors of pixels on an output device. In older usage, the term referred to data intended for display on an output device capable of displaying only two levels. It is used in this book as a synonym for raster.

**Bounding box**

A rectangular box, available in certain applications, that encloses an item so that it can be resized or moved. In 3D applications, the bounding box is parallel to the axes of the object.

**Box**

A container of any shape into which text or pictures are placed in certain applications.

**CAD abb.; computer-aided design**

Strictly speaking, any design carried out using a computer, but the term is generally used with reference to 3D design, such as product design or architecture, where a computer software application is used to construct and develop complex structures.

**CAD/CAM abb.; computer-aided design and manufacture.**

The entire process from concept to finished product.

**Character (1)**

Any single letter, number, punctuation mark, or symbol. Characters were traditionally called sorts.

**Character set**

The complete repertoire of letters, numbers, and symbols in a font design.

**Computer**

An electronic device that can process data (usually binary) according to a predetermined set of variable instructions – a “program.”

**Database**

Information stored on a computer in a systematic fashion and that is thus retrievable. This generally means files in which you can store any amount of data in separate but consistent categories (called “fields”) for each type of information, such as names, addresses, and telephone numbers. The electronic version of a card index system (each card is called a “record”), databases are constructed with applications called “database managers”, which allow you to organize information any way you like.

**Database manager**

An application for constructing databases, allowing you to define, enter, search, sort, and output information. Database managers can be “flat-file”, in which information can be created and accessed only in a single, self-contained database, or “relational”, in which information can be shared and exchanged across two or more separate databases. Other database managers are those in which the fields are predefined (but unmodifiable) for a specific purpose, such as in contact managers (electronic address books). Database managers are also known as database engine, database management systems (DBMS), or even as a database.



**Document (1)**

Any file that is created or modified on a computer by means of application software, such as a letter written in a word-processing application or a design created in a page-layout application. A document file is generated on your hard disk the first time you save something—a dialog box will appear, asking you what you want to call the document and where you want it to reside. There after, each time you save changes to your document, the original is updated rather than created anew. To create a new version of the same document, use the "Save as..." command. Also known as a data file.

**EPS abbr.: encapsulated PostScript**

A standard graphics file format used primarily for storing "object-orientated", or "vector", graphics files (a vector is a tiny database giving information about both magnitude and direction of a line or shape) generated by "drawing" applications such as Adobe Illustrator and Macromedia Freehand.

**File format**

The way a program arranges data so it can be stored or displayed on a computer. This can range from the file format used uniquely by a particular application, to those that are used by many different software programs. In order to help you work on a job that requires the use of several applications, or to work with other people who may be using applications different from yours, file format tend to be standardized. Common file formats are 'TIFF' and JPEG for bitmapped image files, EPS for object-oriented images files, and ASCII for text files.

**Flag (3)**

Certain attributes such as locked, invisible, busy, etc., of files stored on a disk.

**graphics data**

Data which may or may not have a physical representation, intended for display on an output device.

**graphics file**

A file containing graphics data.

**graphics file format**

The definition of, and conventions associated with, a file structure used for the storage of graphics data.

**hypertext**

A collection of graphical and textual data organized in such a way as to facilitate easy access to all of the information it contains. Hypertext may be thought of as a precursor to multimedia, or simply as an extension of it. Certain extensions of hypertext are becoming known as hypermedia.

**ID number**

An acronym for identity number. A number given to a device, file, or message to distinguish it from others. For example, an ID number is required by peripheral devices in a SCSI chain, or may sometimes be given in error alert boxes to indicate the likely cause of the error, or be used to give a font a unique identity cell.

A single space or unit for entering data in rows and columns, such as in a spreadsheet.

**Import**

To bring text, pictures, or other data into a document.

**Import/export filter**

In some applications, a feature for translating a file from the host format to that of another, and vice versa.

**Interactive mode**

The ability of an application to process data as it is input, as distinct from that which is processed in batches (batch mode), for example, spelling is checked as it is input rather than later as a batch. Also called real-time processing.

**Item**

A term used to describe virtually any individual object created in a computer application, such as text boxes, picture boxes, and rules.

**Lookup field**

A field in a database file that provides the same information as a specified field in another file.

**Macro**

A term deriving from the Greek makros, meaning long or large. "Macroscopic", for example, means large units, whereas microscopic describes small things. In computer parlance, a macro is a single command containing several other commands-one large unit composed of smaller units-thus the term describes a sequence of actions or commands that have been recorded so they can be repeated at any time using a single command (usually a keystroke).

**Native file format**

A file format for exclusive use by the application in which the files were created, although some applications may be able to read files created in another's native format.

**Object-oriented**

A software technology that uses mathematical points, based on "vectors" (information giving both magnitude and direction), to define lines and shapes, these points being the "objects" referred to. As distinct from a graphic shape as an object (an "object" in computer programming is a database of mathematical formulae). The data for each shape is stored in these points, which in turn pass information from one to another on how the paths between them should be described-as straight lines, arcs, or Bezier curves.

The alternative technology for rendering computer images is that of "bitmapped" graphics, which are edited by modifying individual pixels or by turning them on or

**Origin**

The fixed, or zero, point of horizontal and vertical axes, or of the rules featured in most applications from which measurements can be made.

**Outliner**

The part of a word-processing application that shows the structure of a document, such as headings and text off.

**Paint(ing) applications**

Applications that use bitmaps of pixels to create images rather than the "vectors" that describe the lines in drawing applications (called object-oriented), although some applications combine both.

**Page description language (PDL)**

A programming language via which your computer communicates with a printer, describing to it image and font data so it can construct and print the data to your specifications. PostScript is the most widely used PDL.

**Page-layout/makeup application**

Any application that enables you to carry out all of the functions normally associated with page design, layout, and makeup.

**Path(2)**

A line drawn in an object-oriented application.

**PDF abb.: portable document format**

A cross-platform format that allows complex, multifeatured documents to be created, retaining all text and picture formatting, then viewed and printed on any computer that has an appropriate "reader" installed, such as Adobe Acrobat Reader.

**Plug-in**

Software, usually developed by a third party, which extends the capabilities of a particular program. Plug-ins are common in image-editing and page-layout applications for such things as special effect filters. Plug-ins are also common in Web browsers for such things as playing movies and audio, although these often come as complete applications ("helper applications"), which can be used with a number of browsers rather than any specific one.

**Point (2)**

In object-oriented drawing applications, the connections (Bezier points) that mathematically define the characteristics of line segments, such as where they start and end, how thick they are, and so on (each point is a "vector" or tiny database of information). Lines are manipulated by dragging "control handles" (sometimes called guidepoints) from the point, which act on the line like magnets.

**Portable Document Format (PDF)**

A proprietary (by Adobe®) "portable document format" (PDF) file, which has fonts and pictures embedded in the document, enabling it to be viewed and printed on different computer systems.

**PostScript**

Adobe System Inc.'s proprietary "page description language" (PDL) for image output to laser printers and high-resolution image setters.

**Preview**

In some graphics applications, the facility to view item by showing what it will eventually look like when printed, with any attributes, such as colors and fills, that may have been applied.

**Property**

The attributes of digital object, such as size, position, color, orientation, etc.

**Record**

An individual entry on one subject-such as a person-in a database, comprising a set of related fields, such as that person's name, address, and telephone number.

**Rich text format (RTF)**

A Microsoft file format for transferring formatted text and some word-processing formatting.

**Save**

The computer command that transfers data from memory to disk, ensuring that work is preserved.

**SDK abbrev.: Software Developers Kit**

A kit containing information and special software to help programmers write programs for a particular software product.

**Software**

Specially written pieces of data, called program, that make it possible for a computer or any other item of computer-related hardware to perform its tasks. Software comes in the form of the "operating system" and related files ("extensions") that make your computer work, "utilities" for performing specific day-to-day tasks such as virus-checking and backups, and "applications", which are used to produce work, whether it be page layout (for which you may use Adobe InDesign or QuarkXPress), image manipulation (Adobe Photoshop), drawing (Adobe Illustrator or Macromedia Freehand), or word processing.

**Source**

Any document, file, disk, etc., which is original, as opposed to a copy.

**String**

All characters within a given sequence, including spaces and special characters.

**raster**

Refers to graphics data represented by color values at points, which taken together describe the display on an output device. Bitmap is used in preference to raster in this book.

**Relational database**

A database application in which the information in separate files-a completely different "address book", for example - is interchangeable. As distinct from a "flat-file" database in which each file is self-contained and cannot exchange information with another file.

**RTF**

Rich Text Format, a standard developed by Microsoft Corporation to encode formatted text and graphics for interchange between applications. The format contains the descriptions of the fonts used within the document, as well as styles and formats, the paragraph width, height and margins, as well as tab indentation information. A least-common-denominator format used mainly in word-processor documents.

**Search and replace**

The automated process of finding specified data, such as text or images, within a document and substituting it with replacement data.

**Search engine**

The part of program, such as a database, that seeks out information in response to requests made by the user. On the web, search engines such as Yahoo, HotBot, and Alta Vista provide sophisticated criteria for searching, and provide summaries of each result as well as the Web site addresses for retrieving more information.

**Style sheet**

In applications such as those used for page-layout and graphics and the construction of HTML pages, the facility to apply a range of specific, frequently used attributes, such as typographic or graphic formats, to text and graphic elements in a document.

**Tab-delimit**

To separate elements of data, such as records or fields in a database, using the Tab key.

**Text file**

A file containing only ASCII text bits, with no formatting, which can be "read" on any operating system.

**Transformation tool**

In some applications, the name given to tools that change the location or appearance of an item, such as scale or reflection.

**Type effect**

The digital modification of type characters to create a special effect, such as outline, zoom, etc.

**Type style**

A digital modification of a typeface, such as italic, shadow, outline, etc., as distinct from the "real" versions of those typefaces.

**Utility (program)**

A program that enhances or supports the way you use your computer generally, as distinct from those programs that enable you to do specific work (applications). Typical utilities are programs for backup, font management, file-finding, disk management, file recovery, plug-ins, screen savers, etc.

**Unicode**

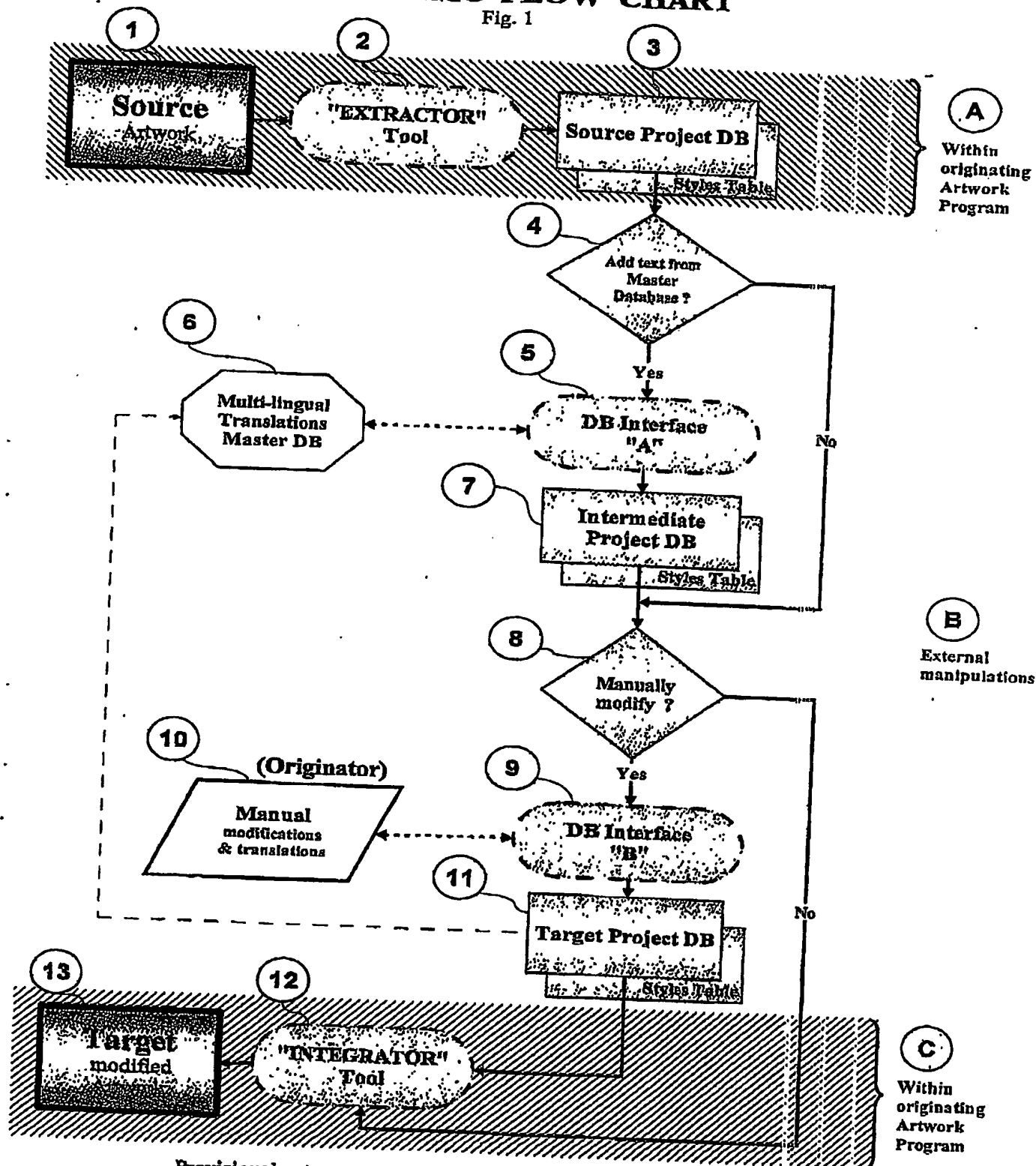
A character set system that makes provision for 65,000 characters, thus accommodating the languages of the world.

**vector**

Refers to graphics data composed mainly of representations of lines and outlines of objects, which can be compactly represented by specifying sets of key points. A program displaying vector data must know how to draw lines by interpolating points between the key points.

## SCHEMATIC FLOW CHART

Fig. 1



Provisional patent application by Shaul Shapiro / Varilang Soft Ltd.  
**CONFIDENTIAL**

# Source Project DB

*Simplified sample*

| Original text        | Original<br>TypeStyle | Candidate<br>New<br>Translation<br>Text | New<br>TypeStyle | New<br>ID | Original<br>layer | Font<br>Name         | Font<br>Size | Font<br>Alignment<br>(L/C/R) | Font<br>Color | Kerning | Print<br>Data<br>(1/0) | Geo.<br>Data<br>(1/0) | Comments |
|----------------------|-----------------------|---|------------------|-----------|-------------------|----------------------|--------------|------------------------------|---------------|---------|------------------------|-----------------------|----------|
| Mediterranean<br>Sea | St-001                |   | St1-001          | 6         | Waterbody         | Times-<br>BoldItalic | 7            |                              | Blue          |         | 1                      | 1                     |          |
| Adriatic Sea         | St-001                |   | St1-001          | 7         | Waterbody         | Times-<br>BoldItalic | 7            |                              | Blue          |         | 1                      | 1                     |          |
| Rome                 | St-002                |   | St1-002          | 8         | Capital           | Times-<br>Roman      | 7            |                              | Blk           |         | 1                      | 1                     |          |
| Milan                | St-003                |   | St1-003          | 9         | City              | Times-<br>Roman      | 6            |                              | Blk           |         | 1                      | 1                     |          |
| Naples               | St-003                |   | St1-003          | 10        | City              | Times-<br>Roman      | 6            |                              | Blk           |         | 1                      | 1                     |          |
| Venice               | St-003                |   | St1-003          | 11        | City              | Times-<br>Roman      | 6            |                              | Blk           |         | 1                      | 1                     |          |
| Sicily               | St-004                |   | St1-004          | 12        | Islands           | Helvetica            | 6            |                              | Blk           |         | 1                      | 1                     |          |
| Sardinia             | St-004                |   | St1-004          | 14        | Islands           | Helvetica            | 6            |                              | Blk           |         | 1                      | 1                     |          |
| Corica               | St-004                |   | St1-004          | 15        | Islands           | Helvetica            | 6            |                              | Blk           |         | 1                      | 1                     |          |
| ITALY                | St-005                |   | St1-005          | 17        | Countries         | Myriad-<br>Roman     | 10           |                              | Blk           |         | 1                      | 1                     |          |

Fig.2

# Source Project DB - Styles Table - (partial)

*Simplified sample*

| TypeStyle ID | Layer name | Font name        | Font size | New TypeStyle ID | New Font name | New Font size | Sample name       |
|--------------|------------|------------------|-----------|------------------|---------------|---------------|-------------------|
| St-001       | Waterbody  | Times-BoldItalic | 7         | St1-001          |               | 0             | Mediterranean Sea |
| St-002       | Capital    | Times-Roman      | 7         | St1-002          |               | 0             | Rome              |
| St-003       | City       | Times-Roman      | 6         | St1-003          |               | 0             | Milan             |
| St-004       | Islands    | Helvetica        | 6         | St1-004          |               | 0             | Sicily            |
| St-005       | Countries  | Myriad-Roman     | 10        | St1-005          |               | 0             | ITALY             |

Fig. 3



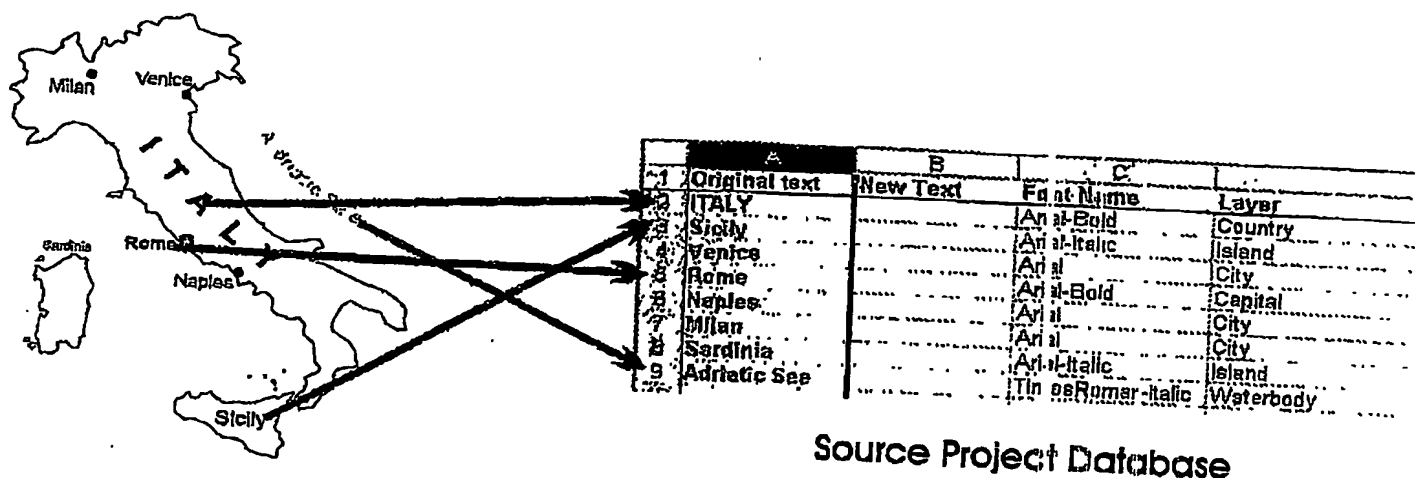
# Target Project DB (partial)

*Simplified sample*

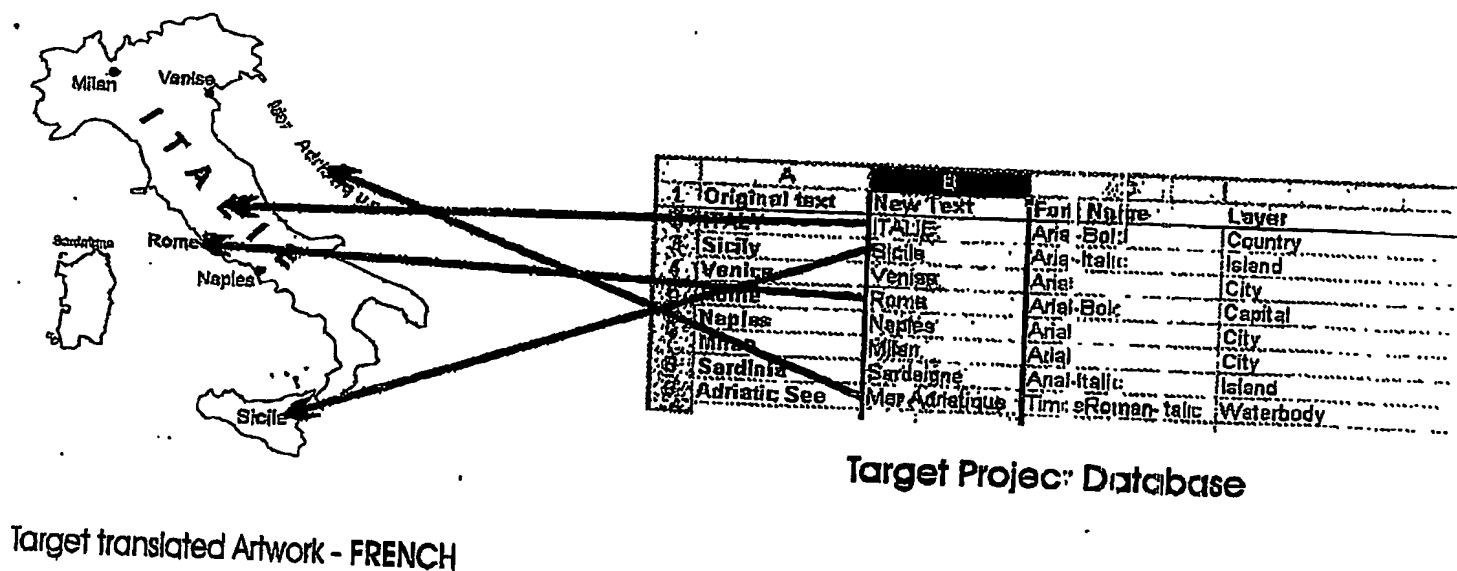
| Original text     | Original TypeStyle | New Text         | New TypeStyle | New ID | Original layer | Font Name        | Font Size | Font Left (L) | Font Center (C) | Font Right (R) | Font Color | Kerning | Print (1/0) | Geo. Data (1/0) | Comments |
|-------------------|--------------------|------------------|---------------|--------|----------------|------------------|-----------|---------------|-----------------|----------------|------------|---------|-------------|-----------------|----------|
| Mediterranean Sea | St-001             | Mér Méditerranée | St1-001       | 6      | Waterbody      | Times-Bolditalic | 7         | L             |                 |                | Blue       |         | 1           | 1               |          |
| Adriatic Sea      | St-001             | Mér Adriatique   | St1-001       | 7      | Waterbody      | Times-Bolditalic | 7         | L             |                 |                | Blue       |         | 1           | 1               |          |
| Rome              | St-002             | Rome             | St1-002       | 8      | Capital        | Times-Roman      | 7         | L             |                 |                | Blk        |         | 1           | 1               |          |
| Milan             | St-003             | Milan            | St1-003       | 9      | City           | Times-Roman      | 6         | L             |                 |                | Blk        |         | 1           | 1               |          |
| Naples            | St-003             | Naples           | St1-003       | 10     | City           | Times-Roman      | 6         | L             |                 |                | Blk        |         | 1           | 1               |          |
| Venice            | St-003             | Venise           | St1-003       | 11     | City           | Times-Roman      | 6         | L             |                 |                | Blk        |         | 1           | 1               |          |
| Sicily            | St-004             | Sicile           | St1-004       | 12     | Islands        | Helvetica        | 6         | L             |                 |                | Blk        |         | 1           | 1               |          |
| Sardinia          | St-004             | Sardaigne        | St1-004       | 14     | Islands        | Helvetica        | 6         | L             |                 |                | Blk        |         | 1           | 1               |          |
| Corsica           | St-004             | Corse            | St1-004       | 15     | Islands        | Helvetica        | 6         | L             |                 |                | Blk        |         | 1           | 1               |          |
| ITALY             | St-005             | ITALIE           | St1-005       | 17     | Countries      | Myriad-FAVARIAN  | 10        | L             |                 |                | Blk        |         | 1           | 1               |          |

Fig. 4

**Fig. 5**  
Automatic Extraction of Text Objects to Source Project Database



**Fig. 6**  
Automatic Integration of Text Objects from Target Project Database



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